

IN THE SPECIFICATION:

Please REPLACE the paragraph beginning at page 2, line 29, as follows:

As shown in Fig. 13, a plurality of light emission spectrums appears in the visible light wavelength range above 580 nanometers. The peak of the light emission of the discharge gas (585 nanometers) is adjacent to the maximum light emission peak (590 nanometers) of the red fluorescent material. Therefore, orange color due to the light emission of the discharge gas is added regardless of the color reproduced by the fluorescent material, so the reddish display occurs over the entire screen. In Fig. 14, the inside of the triangle of the solid line connecting the color coordinates of the respective fluorescent materials, plotted with small rectangles, is the reproducible color range when the color of the gas light emission is not added. In Fig. 14, the inside of the triangle of the broken line is the color reproducible range of the PDP measured in a darkroom. The real color reproducible range is narrowed compared with the original color reproducible range. Especially, reproducibility of blue and green colors is inferior. Concerning the red color, the reproducibility is not so deteriorated since the wavelength of the gas light emission is approximate to that of the light emission of the fluorescent material. However, focusing on the light color of the fluorescent material, the red fluorescent material is different from the ideal red (620 nanometers) defined in the NTSC system. Namely, even if the influence of the gas light emission is little, it is still necessary to improve the color purity of red color. At present, there is no red fluorescent material that emits light of ideal red color and satisfies other use conditions such as efficiency of exciting ultraviolet rays and life. Green and blue fluorescent materials can emit light of substantially ideal color.

Please REPLACE the paragraph beginning at page 4, line 29, as follows:

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There is a method for adjusting the relative light intensities of red, green and blue colors by selecting the fluorescent materials, a forming shape thereof (i.e., the shape in which the fluorescent material is found) or the forming area thereof (i.e., the area on which the fluorescent material is formed). This method substantially reduces the brightness of the panel since the light intensities of green and red fluorescent materials are weakened compared with that of the blue fluorescent material that is usually lacking in intensity. Furthermore, there is a limited selection of materials as mentioned above. The adjustment by the forming shape has low reproducibility. If the cell size of blue color is increased to enlarge the forming area thereof, the margin of the voltage to be applied is narrowed and the display becomes unstable since the display characteristics depend on the cell size. In addition, manufacture of panels having different light intensities of the fluorescent material in accordance with the use and the region (country) of use may deteriorate the productivity.

Please REPLACE the paragraph beginning at page 5, line 30, as follows:

B3

Another problem about the color temperature is that contrast in a well-lighted room is low. The contrast in a well-lighted room (hereinafter, referred to as the bright-room contrast) means a ratio of intensity of light emitted by the fluorescent material and intensity of external light reflected by the PDP. In general, PDPs have a large reflection ratio of external light and a small value of the bright-room contrast. It is clear that the bright-room contrast will be improved by raising the light intensity of the panel and reducing the reflection ratio of external light, but it is not easy to satisfy the compatibility between them. For example, improvement of the filter for EMI measure is considered. Usually, the front surface of the PDP is provided with a filter having transmittance of 40-70% over the entire region of visible light wavelength for protecting interference of electromagnetic field. Though the light emitted inside the panel passes through the filter only once, the external light passes through the filter twice, once each in both directions. Therefore, the filter improves the bright-room contrast. If the filter having less transmittance is used, the bright-room contrast is further improved. However, since the improvement of the color temperature by the above-mentioned method will reduce the light intensity of the panel, the filter having low transmittance cannot be used for improving the bright-room contrast.

Please REPLACE the paragraph beginning at page 10, line 15, as follows:

Fig. 3A is a schematic view of a planar display apparatus.

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Fig. 3B is an exploded view of a representative portion of the PDP of Fig. 3A illustrating an internal construction of same according to the present invention.

Please REPLACE the paragraph beginning at page 11, line 19, as follows:

The plasma display apparatus 100 includes a PDP 1 that is a color display device, a driving unit 80 for lighting cells of the PDP 1 in accordance with display contents, an optical filter 60 having a spectrum transparent characteristic unique to the present invention, a front plate 92 for protecting the PDP 1, and an armor cover 90. The front plate 92 is made up by providing an electromagnetic field shield film and an infrared cutting filter onto a substrate that is optically transparent, and applying a surface treatment for non-glare finish. Glass, acrylic resin, polycarbonate, or other materials can be used for making the substrate.

B 5

Please REPLACE the paragraph beginning at page 12, line 1, as follows:

The optical filter 60 has a dimension covering the entire screen that is a set of cells in the PDP 1, and is in intimate contact with the front surface of the PDP 1. The optical filter 60 can be formed by a process such as sticking (i.e., adhering) a laminated filter film, sticking a film in which a pigment or a colorant is dispersed, or laminating a multicoated interference film utilizing thin film technology on the front surface of the PDP 1 directly, or on the front plate 92 so as to overlay the surface of the PDP 1. Characteristics of the optical filter 60 and the front plate 92 are uniform over the entire screen.

B 6

Please REPLACE the paragraph beginning at page 12, line 13, as follows:

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Figs. 2A and 2B show structures of other plasma display apparatuses having various different arrangements of the optical filter.

Please REPLACE the paragraph beginning at page 13, line 13, as follows:

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Fig. 3A is a schematic view of a planar display apparatus.

Fig. 3B is an exploded view of a representative portion of the PDP of Fig. 3A,

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illustrating an internal construction of same according to the present invention.

Please REPLACE the paragraph beginning at page 13, line 29, as follows:

In the PDP 1, a pair of main electrodes X and Y is arranged in each row on the inner surface of a glass substrate 11 that is a substrate of a front substrate structure 10. The row is a line of cells in the horizontal direction of the screen. Each of the main electrodes X and Y includes a transparent conductive film 41 and a metal film (a bus conductor) 42, and is covered with an insulating layer 17 having a thickness of approximately 30 microns made of low-melting glass. The surface of the insulating layer 17 is coated with a protection film 18 made of magnesia (MgO) having a thickness of several thousands angstroms. The address electrodes A are arranged on the inner surface of a glass substrate 21 that is a substrate of a rear substrate structure 20, and is covered with an insulating layer 24 having a thickness of approximately 10 microns. On the insulating layer 24, a division wall 29 having a shape like a band of height 150 microns viewed from the top is disposed at each space between the neighboring address electrodes. These division walls 29 divide the discharging space 30 in the row direction into plural subpixels (plural unit lighting regions), and define the gap size of the discharging space 30. In addition, red fluorescent material 28R, green fluorescent material 28G and blue fluorescent material 28B for color display are arranged coating the inner surface of the rear side including the upper portion of the address electrode A and the side surface of the division wall 29, so that the three colors are arranged in a periodic pattern. The fluorescent materials 28R, 28G and 28B are selected so that white color is reproduced when each of them emits light in the maximum intensity, and the forming shapes of them are the same. A preferred example of the fluorescent materials is shown in TABLE 1.

Please REPLACE the paragraph beginning at page 17, line 12, as follows:

The inventors have studied about the wavelength range to be eliminated, and obtained the following result. Namely, if the wavelength spectrum of the light emission spectrum in which the product of the light intensity and the relative luminosity factor becomes the maximum, i.e., 585 nanometers and the surrounding wavelength spectrum are eliminated, the purities of blue and green colors can be improved along with suppressing the deterioration of red color intensity, the latter result being achieved, at a minimum. In addition, the spectrum of red light emission approaches the monochrome light emission of 620 nanometers that is the ideal in the NTSC standard.

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Please REPLACE the paragraph beginning at page 17, line 23, as follows:

Fig. 5 is a chromaticity diagram showing the result of a filter having a peak absorbency wavelength of 590 nanometers in blue color display. Fig. 6 is a chromaticity diagram showing the result of the filter having a peak absorbency wavelength of 590 nanometers in red color display. Here, an imaginary filter having an ideal absorbency characteristics as shown in Fig. 7 is supposed for studying about the relationship between the transmittance T and the chromaticity at the peak absorbency.

Please REPLACE the paragraph beginning at page 18, line 8, as follows:

The improvement of the color temperature will be explained next. As explained above, if a filter that absorbs light having a wavelength around 590 nanometers is provided, the light intensity of red color decreases and the coordinate of the white color on the chromaticity diagram moves in the direction in which the x value decreases. In other words, the color temperature increases as the arrow in Fig. 8 shows. It is desirable that the chromaticity coordinate in white color be on the blackbody radiation curve shown by the thick line in the figure. However, if the light intensity of only red color is attenuated, deviation from the blackbody radiation in the Y-axis direction increases along with the increase of the attenuation. When the chromaticity coordinate shifts in the direction that Y value increases from the blackbody radiation curve, white color becomes greeny white. When the chromaticity coordinate shifts in the direction that the Y value decreases, the white color starts to contain a little purple. Neither change of white color is desirable. In order to solve this problem, the filter preferably has a characteristic having peak absorbency in the green color wavelength range, too. The transmittance of the filter is set so that the light intensity of the green color decreases to the extent corresponding to the decrease of red color, so that the chromaticity coordinate of the white color can be corrected to be a coordinate on the blackbody radiation curve. Such adjustment of color temperature, though it causes decrease of light intensity due to transparency of the filter, has advantages in that the bright-room contrast is improved in contrast to the adjustment of the signal amplitude that is adopted in the conventional technique, and in that the optimal color temperature can be realized easily in accordance with the use only by changing the filter characteristic. The reason why the bright-room contrast is improved is as follows.

Please REPLACE the paragraph beginning at page 19, line 24, as follows:

B13 Supposing that R and S are constants, the larger L_o is or the smaller T is, the larger the contrast ratio becomes. The improvement of the color purity and the adjustment of the color temperature according to the present invention do not reduce the light intensity L_o , since the adjustment of fluorescent material, the cell structure, and the signal amplitude. In addition, the improvement of the color purity and the adjustment of the color temperature are achieved by reducing the transmittance T, so that the bright-room contrast is improved.

Please REPLACE the paragraph beginning at page 22, line 3, as follows:

B14 In the characteristics of Fig. 11, an absorbency is added whose peak wavelength is close to the wavelength of 525 nanometers, that is, a light emission peak wavelength of the green color fluorescent material 28G so as to solve the problem of the color temperature in the characteristics of Fig. 9. Namely, a first peak absorbency wavelength is a value within the range of 550-620 nanometers (585 nanometers), and a second peak absorbency wavelength is a value within the range of 500-550 nanometers (525 nanometers). The transmittance T_{585} at the wavelength of 585 nanometers is smaller than both the transmittance T_{450} at the wavelength of 450 nanometers and the transmittance T_{620} at the wavelength of 620 nanometers. In addition, the transmittance T_{525} at the wavelength of 525 nanometers is smaller than the transmittance T_{450} . Particularly, the transmittance T_{585} is smaller than 0.7 times the transmittance T_{450} and is smaller than 0.5 times the average transmittance in the blue color wavelength range (distributed light emission of blue color fluorescent material).

Please REPLACE the paragraph beginning at page 23, line 16, as follows:

B15 The color temperature can be adjusted to any value within the range of 5,000-13,000 K by controlling the spectrum transparent characteristic of the optical filter 60. More specifically, if the absorption quantity around 590 nanometers in Fig. 11 is increased so that the transmittance becomes less than 10%, a color temperature above 10,000 K can be achieved and the same performance as a CRT for TV set can be realized. If the absorption quantity around 590 nanometers is decreased to that the transmittance becomes approximately 50%, a color temperature about 6,500 K can be achieved and the same performance as that of a CRT for publishing or designing use or a CRT for a TV set used in Europe can be realized. Namely,